

Mineral Resource

Status of Mining in Arizona

by Dr. Madan M. Singh

Settlement in Arizona started with the impetus provided by mining. Now, however, it appears that a significant proportion of the population has grown averse to the industry. Many are oblivious to the fact that our society is dependent on minerals. If we look all around almost everything we see is a product made of some mineral. A 1,600-square foot house takes nearly 250,000 pounds of minerals to build. The cars we drive, the appliances we use at home and at work, the energy we use for heating or cooling – are all derived from minerals. In fact, it is not an exaggeration to state that *just as DNA is the building blocks of life, minerals are the building blocks of our way of life – our civilization!*

Arizona is blessed to have so much mineral wealth. In 2005 and 2006 it was the Number One nonfuel mining state in the country. Well over 60 percent of the copper in the nation comes from Arizona. It is also the leading producer of molybdenum and one of the major sources of sand and gravel, aggregates, gemstones, zeolites, pumice, silver and perlite. In 2006 the mining industry, both directly and indirectly, contributed over \$13 billion to the economy of the State. This figure is conservative since a number of mining-related activities are not included in this figure. In Fiscal Year 2006 mining paid in excess of \$40 million in State taxes. In addition, it was taxed by County and municipal bodies, and the industry donated generously to local communities and schools.

Many mining companies now subscribe to the principles of Sustainable Development. In the words of the Brundtland Commission (1987) this may be defined as “development that meets the needs of the present without

RECORD VALUE!!

Arizona is again the # 1 mining state in the US with \$6.7 billion!

2006 Preliminary, Nonfuel Mineral Production

Commodity	Value*
Copper	\$5,080,000,000
Gemstone	\$1,370,000
Sand & gravel, const.	\$555,000,000
Crushed stone	\$61,900,000
Other	\$1,020,000,000
Total	\$6,710,000,000

* Unpublished USGS data, subject to change: final data will be published in the Arizona Chapter of the USGS Mineral Yearbook, Area Reports: Domestic 2006, volume 11.

compromising the ability of future generations to meet their own needs.” These companies leave the land disturbed by mining in a condition which is at least as good as it was before mining, although in many cases it is put to better use. For example, Peabody Energy has been concurrently reclaiming the land as they mine the coal. These mines are located on Indian Tribal Lands and Peabody has reclaimed these areas in accordance with the desire of the local people and Tribes. These have included traditional uses such as livestock grazing, cultural plant use, and wildlife habitat. In fact, they have found that the reclaimed areas are up to 20 times more

productive for grazing the sheep, goats, and cattle than the undisturbed native range. The local residents are very appreciative of this fact, since their livelihood and a desire to maintain a traditional way of life depends on it. Peabody has worked with the local groups to help them with grazing management education and rotational grazing programs which has improved the health of their herds, fetches them a better price at market, and maintains productive and sustainable reclaimed grazing lands. Sponsored by the Department of Mines & Mineral Resources, Peabody has won the prestigious Energy Globe Award for their work which will be presented on April 11, 2007 in the European Union Parliament Building in Brussels, Belgium.

BHP Billiton is in the process of restoring the surface above the closed San Manuel mine, and has regraded all the materials that were placed on the surface. Recently they imploded the smelter stacks, after removal of the asbestos from the same. The firm has spent over \$120 million in the process and has involved the local community throughout the restoration. BHP Copper has also performed considerable restoration work at their Pinto Valley operations, and is performing remediation on the water from the Gibson mine on property owned by the friars. Rinker Materials has converted their Cortaro quarry into the Pines of Marana golf course, and CEMEX has just obtained permission from Marana to mine aggregate with the intention of building the Tangerine Commerce Park on the land. The Cotton Center in Phoenix is built on a previous sand and gravel pit, and State Route 51 runs over the Rico Mercury Mill near Northern Avenue. Many other examples could be given.

Some developers see the quick return on investment from construction and, therefore, ignore the fact that they may be sterilizing valuable mineral deposits. These resources are then not readily available to future generations. The local municipalities also get attracted by the immediate tax revenues. Several billion pounds of copper are being impacted by such policies in some parts of the State.

There are several communities, however, that retain an outdated vision of the mining industry and oppose mining in their vicinity. Dust, noise and disturbance are quoted as the main reasons for their posture, even though regulations control these aspects (e.g., ARS 27-412 for dust). The Aggregate Mined Land Reclamation Act of 2005 mandates reclamation plans to be approved before opening new mines. Such objections may be classified as *Environmental Imperialism* – it is acceptable to let poorer areas of Arizona or third world countries bear the relatively minor irritations of extracting minerals, but the residents of the community are too affluent to be bothered by the same. They do not want to make even a small sacrifice but will continue to use the minerals obtained elsewhere, so that *their* life style is not affected.

Getting minerals from elsewhere, when these are available close by, entails higher costs. What is not taken into account is the fact that nearly half of the infrastructure in the region is owned by the government – roads, schools, buildings. Thus the taxpayers are also forced to bear these higher costs. In addition, longer hauls imply greater air pollution, but this is spread over a larger area and affects them only peripherally. This results in health care problems affecting a larger pool of people. Longer hauls also mean greater wear and tear of roads. This in turn, requires more repairs and increased use of materials. Since these costs are spread widely, they are ignored by the community. Congestion on the roads should not be ignored. This is expensive in lost time and leads to an outcry for wider roads (read more materials).

Importing the minerals from other countries entails even more complications. Many of the nations are not friendly, and there is increasing competition from China, India, and other Asian and African countries. Some States have passed legislation that must take into account mineral resourced in their long-term land-use planning. These include Minnesota, Utah, Washington, Colorado, and California. Perhaps it is time for Arizona to consider something similar.



Going . . . Going . . .

An era ended January 17 as the 500-foot, twin smelter stacks at San Manuel mine came down. The dismantling is part of the \$120 million reclamation that BHP Billiton Ltd. is undertaking at the site. The rise in copper prices came too late for the company to reverse the closure, leaving 2 billion pounds of copper unmined in the San Manuel and Kalamazoo ore bodies. BHP put the mine on care and maintenance in May 1999 and changed its status to permanent closure in October 2003. The decision to close the mine came at a time when copper was averaging 65 cents per pound compared with last year's average of \$3.31.

In its day San Manuel was one of the largest underground mines in the world, employing over 2,000 people, processing more than 60,000 pounds of ore per day, and producing over 280 million pounds of refined copper per year. The mine first started production in the 1940s when Magma Copper Company constructed the mine, plant, and railroads, and started the community of San Manuel. For many years the mine provided high-paying jobs and a pleasant place to raise a family.

The reclamation project is the biggest such project ever undertaken in the United States. The company plans an industrial park on the site, plus 15,000 houses.

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New Mining Engineer

Frank Kimbler joined the Department on January 2 as Mining Engineer. Kimbler, originally from Miami, Florida, got his BS degree in earth science from Florida International University and his MS in geology from New Mexico Tech.

Since graduation Kimbler has enjoyed a variety of mining- and geology-related activities. He worked for the National Oceanic and Atmospheric Administration core logging and evaluating shore sediments and mid-Atlantic ridge rocks brought back by the deep submersible Alvin. He worked on the New Mexico MILS project for the New Mexico Bureau of Mines. He wrote *New Mexico Rocks and Minerals, the Collecting Guide*. He has cut lazulite cabochons for Cartier and sorted diamonds for Field Diamonds. Kimbler has also done consulting work and claim staking on gold mines in New Mexico and northern Mexico.

Kimbler is married and has two teenaged sons. His leisure pursuits include astronomy, bio-electronics, light and optics, and exploring backcountry roads.



New Board Member

Governor Janet Napolitano appointed Bob Holmes to the Department's Board of Governors in January. His 5-year term runs through January, 2012.

Holmes, who is a realtor with Desert Classic Realty & Lending, LLC., is a fourth-generation Arizonan. He was born in Phoenix and attended Brophy College Preparatory and the University of Arizona. His great-grandparents moved from Ireland and settled in Globe in the 1870s. After a few not-so-successful years as a wildcat miner, his great-grandfather, William Ryan, changed career directions and opened a general goods store in that community. The store grew into several and eventually became Ryan-Evans, which later turned into Revco Drugs.

An avid collector of meteorites, Holmes has a comprehensive private collection, with an emphasis on Arizona meteorites. A portion of his collection is on loan, and on display, at the Arizona Mining and Mineral Museum.

Of his appointment Holmes says, "Although I have never been involved with mining itself, my family has had close ties to the mining world for many, many years. I look forward to serving the Department and the Museum."



Do you need this information in an alternative format? Please call the Department at 602-255-3795.

Dr. Singh Appointed to Two Councils

In January Dr. Madan Singh, Director, was appointed to serve on the National Research Council (NRC) Committee on Assessing the Need for a Defense Stockpile (CANDS) sponsored by the Defense National Stockpile Center (DNSC). Separately, he was invited to become a member of the Arizona Foundation for Resource Education's Advisory Council.

The National Materials Advisory Board (NMAB) is a part of The National Academies Division on Engineering and Physical Science (DEPS). NMAB is the pre-eminent source of independent materials assessments for the nation. The board's studies deal with the entire life cycle of materials, from mining and synthesis to manufacturing, service performance and recycling/disposal. The National Academies perform an unparalleled public service by bringing together committees of experts in all areas of scientific and technological endeavor. These experts serve *pro bono* to address critical national issues and give advice to the federal government and the public.

Functioning in accordance with general policies determined by the Academy, the National Research Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public and the scientific and engineering communities.

Also in January, Dr. Singh was invited to become a member of the Arizona Foundation for Resource Education's Advisory Council. The Arizona Foundation for Resource Education (AFRE) provides high-quality, engaging and intellectually stimulating professional development opportunities for Arizona K-12 teachers, administrators and informal educators.

AFRE is a collaborative nonprofit organization that unites education, business and other organizations that are engaged in promoting understanding about Arizona's natural resources and the environment.

Museum News

by Susan Celestian, Curator

Sue's 2 cents

In September I was fortunate to go on a trip, with local mineral collectors, to China. It was a journey filled with magnificent scenery, lots of Chinese food, fascinating cultural views, and interesting mineral shopping. One of the primary goals was to establish a relationship with mineral museums at China University of Geosciences in Wuhan and at the Yichang Institute of Geology and Mineral Resources (China Geological Survey) in Lichang. In fact, we presented a number of Arizona and Southwest specimens to Dr. Xu (Wuhan), on behalf of the Museum, the Arizona Mining & Mineral Museum Foundation, and Shirley Fiske. We look forward to a visit by a contingent from China in March. Watch our website for announcements of a welcoming reception and talks.

Keep your eyes open around here! Soon there will be some exciting changes!! We have awarded the contract for construction of Phase One of the Copper Gallery to Exhibit Services. The funding comes from the two grants that Phelps Dodge Foundation has previously awarded to Friends of the Arizona Mining and Mineral Museum (FAMMM), plus additional donations from FAMMM, the Maricopa Lapidary Society, Arizona Prospectors Association and Mingus Gem & Mineral Club. I'll let the new look be a surprise, but installation is scheduled for the week after Family Day.

Speaking of which – February 17th is Family Day. I've been assured that the road construction on 15th Avenue will be completed by then, but in any event our parking lot will be accessible. Admission is free that day and there will be lots to do. The Arizona Prospectors Association will offer gold panning, metal detecting, and expert advice. The Maricopa Lapidary Society is sponsoring dealers, who will be set up on the mezzanine. The spinning wheel will be aspinning.' And children of all ages may create a bracelet, pet rock, or mineral card. So COME ON DOWN –

you might even want to VOLUNTEER for a while. We can always use good help!

In the Lapidary Shop, we are adding a faceting class. Dick McPherson will be teaching the class, which will be limited to 4 students. He does beautiful work and generously shares his expertise with others. If you are interested in more information or in getting on the waiting list, contact Shirley Cote (602-255-3795 ext 10).

You will find Shirley Cote working three days a week as a Tour Guide. She has numerous geology courses under her belt, and an extensive knowledge of things geological, which she loves to share with visitors. She does many things for the Museum: teaches, data entry, informal outreach, exhibit design, shop clerk, brainstormer..... Her attention to detail makes her the perfect guardian of the museum database. She maintains its accuracy and has learned to create lists and reports that make my work SO much easier. Shirley also has a creative bent, and she has created several exhibits, very popular with visitors. Currently on display are a volcano diorama, and two large cases where she connects the elements of the Periodic Table to the ore minerals and items in which those elements are used. An occasional display, the solar system made of rock spheres is always a hit.

So drop by, say "Hi", and wander among the beautiful minerals!

See you in Toronto!



PDAC - 2007

The Department will again be attending the Prospectors and Developers Association of Canada Trade Show from March 4 –7. If you are attending the show please stop by to see us at Booth 834.

Invitation

The Department's Board of Governors, in an effort to improve Department services, will be holding a conference to discuss future developments of the Information Center and Museum. The public is invited to attend and participate in this process. The conference will be held in the Museum auditorium on March 31 starting at 9:00 am. The morning session is open to invitees and for suggestions from the public. The Board of Governors will have a posted agenda for the afternoon session to discuss their ideas for the agency. Lunch will be provided. Please RSVP by calling 602-255-3795, ext. 15 by March 27 if you plan to stay for lunch.

You may also make suggestions and provide input by filling out the enclosed questionnaires. There is one for the Information Center and a separate one for the Museum. The questionnaires are also available on our web-site.

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Address Correction Requested

QUESTIONNAIRE ON THE MINING INFORMATION CENTER

This questionnaire is about the Mining Information Center (MIC). There is a separate questionnaire about the Museum if you have comments for that part of the Department. The data collected will be used at a conference on the future of the Arizona Department of Mines and Mineral Resources to which you are invited on March 31, 2007.

My connection to the ADMMR is (check as many as are applicable):

☐ Visitor

☐ Mining company employee

☐ Government employee

☐ Small mine operator

☐ Geological or mining consultant

☐ Mineral collector

☐ Other _____

☐ Volunteer

☐ Mining Information Center staff member

Please respond by making specific comments or suggestions for any or all of the following items (answer ones about which you have knowledge).

1. Improving or updating the MIC services:

2. Improving or updating the MIC educational and outreach activities:

3. Improving or updating the MIC facilities to 21st century standards (library, IT, etc):

4. Additions to the MIC staff:

(Continued on next page)

5. Capital improvements needed (new equipment such as microscopes, analytical equipment, computers, furniture, etc.):

6. Changes you envision for the MIC within:

a. the next five years:

b. the next ten years:

7. What do you think the goals of the MIC are, or should be?

8. How I and/or my category checked above can help the MIC achieve its goals:

9. Any other suggestions or comments for or about improving the MIC:

10. How do you envision the role of the Board of Governors in the MIC?

Please return this questionnaire if possible before January 20, 2007, otherwise certainly before March 31, to Madan Singh or Jacqueline Hall at Department of Mines and Mineral Resources, 1502 West Washington, Phoenix, Arizona 85007 or by FAX 602-255-3777.

Thank you for your help.

QUESTIONNAIRE ON THE MUSEUM

This questionnaire is about the Arizona Mining and Mineral Museum. If you use the Mining Information Center there is a separate questionnaire you should fill out for that part of the Department of Mines and Mineral Resources. The data collected will be used at a conference on the future of the Department of Mines and Mineral Resources to which you are invited on March 31, 2007.

My connection to the Museum is (check as many as are applicable):

- ☐ Visitor
- ☐ Volunteer
- ☐ Member of a group that meets in the Museum
- ☐ Lapidary shop user
- ☐ Teacher bringing students to the Museum
- ☐ Mineral collector
- ☐ Member of a Museum foundation
- ☐ Museum staff member
- ☐ Other _____

Please respond by making specific comments or suggestions for any or all of the following items (answer ones about which you have knowledge).

1. Improving or updating the Museum exhibits:

2. Improving or updating the Museum educational and outreach activities:

3. Additions to the Museum staff:

4. Capital improvements needed (new equipment such as saws, microscopes, analytical equipment, computers, furniture, etc.):

5. The role of the Museum in relationship to the rest of the Department of Mines and Mineral Resources:

(Continued on next page)

6. Changes you envision for the Museum within:

a. the next five years:

b. the next ten years:

7. What do you think the goals of the Museum are, or should be?

8. How I and/or my category checked above can help the Museum achieve its goals:

9. Any other suggestions or comments for or about improving the Museum:

10. How do you envision the role of the Board of Governors in the Museum's organization, activities, and procedures?

Please return this questionnaire if possible before January 20, 2007, otherwise certainly before March 31, 2007, to Madan Singh or Jacqueline Hall at the Department of Mines and Mineral Resources, 1502 West Washington, Phoenix, Arizona 85007 or by FAX 602-255-3777.

Thank you for your help.